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FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK NY 10112

EXAMINER
LEE,A

ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

☒ Responsive to communication(s) filed on *Oct 4, 1999* _____ .

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire ____*3*____ month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) *1-32* _____ is/are pending in the application.

☐ Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) *1-32* _____ is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐approved ☐disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

    ☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

        ☐ received.

        ☐ received in Application No. (Series Code/Serial Number) _____ .

        ☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

    *Certified copies not received: _____ .

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

III. DETAILED ACTION

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2.   Claims 1-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Goldfeather** (Near Real-Time CSG Rendering... 1989) in view of **Politis** (AU 9523362 A, published Feb. 8, 1996).

Independent claims 1, 8, 11, 17, 24, and 27

Regarding claim 1, **Goldfeather** discloses the claimed features of:

"comparing the region represented by said node to a region [representation data structure] corresponding to one or more regions represented by <u>any</u> other node <u>in said expression tree</u>" (pp.21~23, CSG rendering using the normalization method; regions A~D);

"determining if the region represented by said node is totally or partially obscured by said one or more regions" (pp.21~23, CSG rendering using the normalization method; *Fig. 4*; regions A~D); and

"modifying the expression tree in the event that the region represented by said node is at

least partially or totally obscured" (pp.21~23, CSG rendering using the normalization method;

normalization of regions A~D).

Goldfeather does not explicitly disclose the compared region is of "representation data

structure". However, **Politis** teaches this at col. p. 17, line 5 through p. 19, line 14, regarding the

bounding boxes of lead nodes. It would have been obvious to one having ordinary skill in the art

to combine the teachings of **Goldfeather** with **Politis**, because they both relate to using

expression trees for image rendering, and the teachings in **Goldfeather** at pp.21~23, "CSG

rendering using the normalization method" of comparing regions at the nodes, provide the

motivation to further employ the optimization techniques in **Politis** of "a region representation

data structure," in order to advantageously composite the desired images more quickly, as per the

claimed invention.

Regarding claim 8, **Goldfeather** discloses "determining at a current node if a region of the

image represented at said current node is obscured by regions represented by any other node in

said expression tree, and modifying said expression tree in the event that the current node is

partially or totally obscured" (pp.21~23, CSG rendering using the normalization method).

Politis teaches "traversing the expression tree node by node" (page 10, lines 11-19; a first

pass of bounding box minimization from all leaf nodes up to the root node at page 16, line 24

through page 18, line 17 and in Fig. 17; a second pass of bounding box minimization from the

root node down to the leaf nodes at page 18, line 18 through page 19, line 30 and in Fig. 18).

It would have been obvious to one having ordinary skill in the art to combine the teachings

of **Goldfeather** with **Politis**, because they both relate to using expression trees for image

rendering, and the teachings in **Goldfeather** at pp.21~23, "CSG rendering using the normalization

method" of comparing regions at the nodes, provide the motivation to further employ the

optimization techniques in **Politis** in order to advantageously composite the desired images more

quickly, as per the claimed invention.

Claim 17 recites the corresponding apparatus to method claim 1, and thus the rejections to

claim 1 hereinabove are also applicable to claim 17.

Claim 24 recites the corresponding apparatus to method claim 8, and thus the rejections to

claim 8 hereinabove are also applicable to claim 24.

Regarding claim 11, **Goldfeather** discloses the claimed features of:

"(I) receiving a first region representation from a parent node" (page 18, lines 18-27; node

43);

"(ii) passing to a first operand of said graphical operator a modified first region

representation in accordance with a first predetermined modification rule for said operator"

(pp.21~23, CSG rendering using the normalization method);

"(iii) returning to the graphical operator a second region representation of regions

obscured by a sub-tree associated with the first operand" (pp.21~23, CSG rendering using the

normalization method);

"(iv) passing to a second operand of said graphical operator a modified second region

representation in accordance with a second predetermined modification rule for said operator"

(pp.21~23, CSG rendering using the normalization method);

"(v) returning to the graphical operator a third region representation of regions obscured

by a sub-tree associated with the second operand" (pp.21~23, CSG rendering using the

normalization method); and

"(vi) determining, in accordance with a set rule for said graphical operator, a final region

representation to be returned to the parent node"(pp.21~23, CSG rendering using the

normalization method).

Politis teaches "traversing the expression tree node by node" (page 10, lines 11-19; a first

pass of bounding box minimization from all leaf nodes up to the root node at page 16, line 24

through page 18, line 17 and in Fig. 17; a second pass of bounding box minimization from the

root node down to the leaf nodes at page 18, line 18 through page 19, line 30 and in Fig. 18).

It would have been obvious to one having ordinary skill in the art to combine the teachings

of **Goldfeather** with **Politis**, because they both relate to using expression trees for image

rendering, and the teachings in **Goldfeather** at pp.21~23, "CSG rendering using the normalization

method" of comparing regions at the nodes, provide the motivation to further employ the

optimization techniques in **Politis** in order to advantageously composite the desired images more

quickly, as per the claimed invention.

Claim 27 recites the corresponding apparatus to method claim 11, and thus the rejections

to claim 11 hereinabove are also applicable to claim 27.

Dependent claims 2-7, 9, 10, 12-16, 18-23, 25 and 26

Regarding claim 2, **Politis** discloses the claimed features of: "wherein the step of

modifying the expression tree includes applying a clipping operator to said node in the event the

region represented by said node is partially obscured" (page 31, claim 1).

Regarding claim 3, **Politis** discloses the claimed features of: "wherein the step of

modifying the expression tree when said node is totally obscured further includes the steps of: if

the node is a graphical element, removing the node" (page 18, line 31 through page 19, line 3;

page 23, lines 5-24) and "if the node is a graphical operator, applying a predetermined set of node

replacement rules in accordance with said graphical operator" (page 23, lines 5-24).

Regarding claim 4, **Politis** does not explicitly disclose all of the claimed features regarding

the specific replacement rules. However, these would have been obvious to one having ordinary

skill in the art at the time of Applicant's invention, because the teachings/suggestions in **Politis**, at

for example, page 23, lines 5-27, page 29, lines 1-18, and the various graphical operators shown

at page 2, Table 1, provide the motivation to further apply various other optimization rules in

order to optimize the expression tree as per the claimed features for advantageously compositing

graphical images.

Regarding claims 5/1, 5/2 and 5/3, **Politis** discloses the claimed features of: "wherein the

graphical operators are image compositing operators" (page 2, Table 1). Thus, the claimed

features based on the dependency to any of claims 1-3 are deemed obvious.

Regarding claim 5/4, **Politis** discloses the claimed features of: "wherein the graphical

operators are image compositing operators" (page 2, Table 1). Thus, the claimed features based

on the dependency to claim 4 is deemed obvious.

Regarding claim 6, **Politis** discloses the claimed features of: "wherein the region

representation is of the form of a hierarchical data structure" (page 8, lines 15-28, whereby

expression trees are a form of hierarchical data structure).

Regarding claim 7, **Politis** discloses the claimed features of: "wherein the hierarchical data structure is a quadtree representation" (page 8, lines 15-28, whereby expression trees inherently include octrees and quadtrees).

Regarding claim 9, **Politis** discloses the claimed features of: "wherein said modifying includes removing said current node or replacing said current node with another node of the expression tree" (page 23, lines 5-24).

Regarding claim 10, **Politis** discloses the claimed features of: "wherein said modifying further includes clipping, or making for clipping at a later time, the region represented by said current node" (page 19, line 31 through page 22, line 23; page 27, lines 12-15).

Regarding claim 12, **Politis** discloses the claimed features of: "(a) where the graphic operator is an "over" or a "plusC" operator..." (page 17, Table 5); "(b) where the graphic operator is an "in" operator..." (page 17, Table 5); "(c) where the graphic operator is an "ratop" operator..." (page 17, Table 5); "(d) where the graphic operator is an "out" operator..." (page 17, Table 5); and "(e) where the graphic operator is an "Xor" or "plusW" operator..." (page 17, Table 5).

Regarding claim 13, **Politis** discloses the claimed features of: "passing substantially the
first region representation as the modified first region representation in the event that the
graphical operator is an "over", "in", "ratop", "plusC", "plusW"...." (page 17, line 24 through
page 18, line 17; page 17, Table 5); and "if the graphical operator is an "out" (visit right operand
first) operation....." (page 19, line 31 through page 20, line 9).

Regarding claim 14, **Politis** discloses the claimed features of: "passing substantially the
first region representation as the modified first region representation in the event that the
graphical operator is an "in", "ratop", "out", "plusC", "plusW"...." (page 17, line 24 through page
18, line 17; page 17, Table 5); and "if the graphical operator is an "over" operator....." (page 17,
line 24 through page 18, line 5; page 27, lines 12-19).

Regarding claim 15, *a multiple dependent claim*, **Politis** discloses the claimed features of:
"wherein the image representation is not created at a node, or returned to a parent node of said
node, unless said image representation is subsequently utilised" (page 16, lines 7-23). Thus, the
claimed features based on the dependency to claims 11-14 are deemed obvious, based upon the
rejections to claims 11-14 hereinabove.

Regarding claim 16, **Politis** discloses the various claimed features therein at page 22, line
23 through page 30, line 6.

Claims 18, 19, 22 and 23 recite the corresponding apparatus to method claims 2, 3, 6 and 7, and thus the rejections to claims 2, 3, 6 and 7 hereinabove are also applicable to claims 18, 19, 22 and 23, respectively.

Claims 20 and 21 recite the corresponding apparatus to method claims 4 and 5, and thus the rejections to claims 4 and 5 hereinabove are also applicable to claims 20 and 21, respectively.

Claims 25 and 26 recite the corresponding apparatus to method claims 9 and 10, and thus the rejections to claims 9 and 10 hereinabove are also applicable to claims 25 and 26, respectively.

Claims 28-32 recite the corresponding apparatus to method claims 12-16, and thus the rejections to claims 12-16 hereinabove are also applicable to claims 28-32, respectively.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Any response to this action should be mailed to:

> Commissioner of Patents and Trademarks
> Washington, D.C. 20231

or faxed to:

> (703) 308-9051, (for formal communications intended for entry);

Or:

(703) 308-6606 (for informal or draft communications, please label "PROPOSED" or "DRAFT").

Hand-delivered responses should be brought to Crystal Park II, 2021 Crystal Drive,

Arlington, VA., Sixth Floor (Receptionist).

Any inquiry concerning this communication or earlier communications from the examiner

should be directed to Albert K. Lee whose telephone number is (703) 306-4527. He can normally

be reached Monday-Thursday and alternate Fridays from 7:30am-5:00pm. If attempts to reach the

examiner are unsuccessful, the examiner's supervisor, Mark R. Powell, can be reached on (703)

305-9703. Any inquiry of a general nature or relating to the status of this application should be

directed to the Group receptionist whose telephone number is (703) 305-3900.
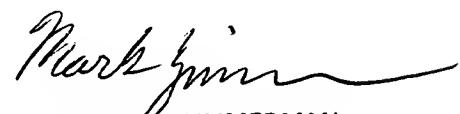
MARK K. ZIMMERMAN
PRIMARY EXAMINER

akl

Dec. 13, 1999